

WHAT IS CLAIMED IS:

1. A method of forming porous particles comprising preparing a mixture of an organic phase and an aqueous phase, said mixture comprising an unsaturated polyester, a water immiscible organic solvent, at least one organic-soluble ethylenically unsaturated monomer, and initiator; subjecting said mixture to high energy emulsification; initiating crosslinking of said polyester after emulsification; and removing said water immiscible organic solvent to recover porous polyester particles.
2. The method of claim 1 wherein said initiating crosslinking is initiated by heating.
3. The method of claim 1 wherein prior to preparing said mixture said polyester is in said aqueous phase.
4. The method of claim 1 wherein prior to preparing said mixture said polyester is in said organic phase.
5. The method of claim 1 wherein said mixture further comprises an emulsifier.
6. The method of claim 1 wherein said mixture further comprises an emulsifier in said aqueous phase.
7. The method of claim 1 wherein said high energy emulsification comprises high shear mixing.
8. The method of claim 1 wherein said high energy emulsification comprises sonication.

9. The method of claim 1 wherein said high energy emulsification comprises homogenization.

10. The method of claim 1 wherein said high energy emulsification comprises microfluidization.

11. The method of claim 2 wherein said heating is at a temperature of between 30 and 100 degrees C.

12. The method of claim 2 wherein said heating is for a period of between 0.5 and 16 hours.

13. The method of claim 1 wherein said removing of said organic solvent is by evaporation.

14. The method of claim 1 wherein said removing of said organic solvent is by azeotropic distillation.

15. The method of claim 1 wherein said removing of said organic solvent is by low pressure distillation

16. The method of claim 1 wherein said removing of said organic solvent is by diafiltration or dialysis.

17. The method of claim 1 wherein said initiating of crosslinking is by redox initiation.

18. The method of claim 1 wherein said removing of said organic solvent is by pouring the mixture after crosslinking into a water miscible organic solvent and recovering said particles by filtration or sedimentation.

19. The method of claim 1 wherein said particles after removal of said water immiscible organic solvent are freeze dried.

20. The method of claim 1 wherein said mixture further comprises a cosurfactant stabilizer.

21. The method of claim 1 wherein said mixture further comprises colloidal inorganic particles.

22. The method of claim 1 wherein said polyester comprises at least one acid equivalent member selected from the group consisting of maleic, fumaric, itaconic, phenylenediacrylic acid, citraconic and mesaconic.

23. The method of claim 22 wherein said polyester further comprises a sulfonated diacid.

24. The method of claim 22 wherein said polyester has an acid number of at least 10.

25. The method of claim 22 wherein said polyester has an average (Mn) molecular weight of 1,000 to 30,000 gm/mole.

26. The method of claim 1 wherein said at least one organic soluble ethylenically unsaturated monomer comprises at least one member selected from the group consisting of styrene, alkylstyrenes, divinylbenzene, ethylene glycol dimethacrylate, ethylene glycol divinyl ether, divinyl adipate, cyclohexanedimethanol divinyl ether, and methacrylate esters.

27. The method of claim 1 wherein said at least one organic soluble ethylenically unsaturated monomer comprises at least two ethylenically unsaturated chemical functionalities.

28. The method of claim 27 wherein said chemical functionalities are selected from at least one member of the group consisting of vinyl groups, acrylates, methacrylates, vinyl ethers, and vinyl esters.

29. The method of claim 1 wherein said initiator is selected from the group consisting of azo compounds, organoperoxides, organohydroperoxides, persulfate salts, and redox initiators.

30. The method of claim 1 wherein said water immiscible organic solvent is at least one member selected from the group consisting of benzene, toluene, xylene isomers, acetate esters, isopropyl ether, butyl ether, chloroform, carbon tetrachloride, and 1,2-dichloroethane.

31. The method of claim 5 wherein said emulsifier is selected from the group consisting of sulfosuccinate esters and their salts, tetraalkylammonium salts, alkylphenol ethoxylates, PEO-PPO block copolymers, poly(vinyl alcohol), poly(vinyl pyrrolidone), salts of long chain alkylsulfonates, sulfonated alkylated diphenyl ethers, naphthalenesulfonate salts, alkylbenzenesulfonate salts, and colloidal silica.

32. The method of claim 1 wherein said unsaturated polyester and said at least one organic-soluble ethylenically unsaturated monomer are present in a weight ratio of 7:1 to 1:7.

33. The method of claim 1 wherein said unsaturated polyester comprises at least 20 mole percent unsaturated diacid units based on total diacid units.

34. The method of claim 1 wherein said unsaturated polyester has an ionic group equivalent molecular weight of between 400 and 2000 grams of polymer per mole of ionic unit.